Trend Study 17-17-02

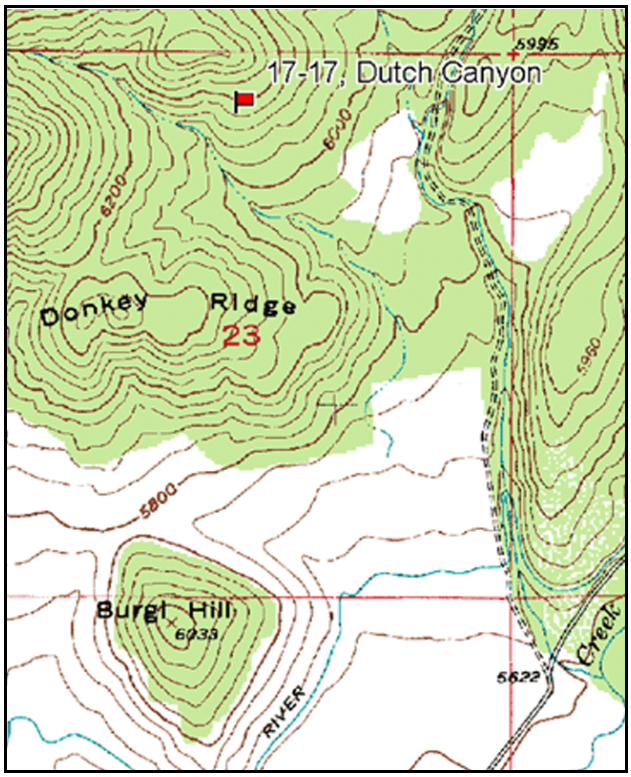
Study site name: Dutch Canyon . Vegetation type: Big Sagebrush-Grass .

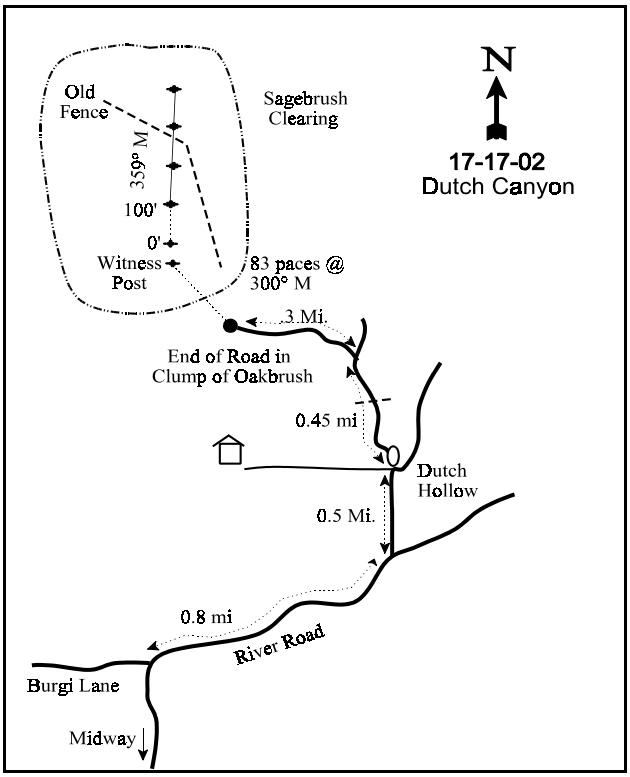
Compass bearing: frequency baseline 359 degrees magnetic.

Frequency belt placement: line 1 (11, 59, & 95ft), line 2 (34ft), line 3 (71ft).

LOCATION DESCRIPTION

Beginning at the intersection of River Road and Burgi Lane (north of Midway), proceed northward on River Road for 0.80 miles to an intersection. Turn left and proceed 0.50 miles to a dead end. From the dead end, proceed northwest on a jeep trail leading through the gambel oak. Proceed 0.45 miles to a fork in the road. Take the left fork for 0.30 miles to where the road ends and stop. From the end of the road, the 0-foot baseline stake is 83 paces away at an azimuth of 300 degrees magnetic. The frequency baseline is marked by green steel "T" fenceposts, approximately 12 to 18 inches in height. A red browse tag, number 3952, is attached to the 0-foot baseline stake.





Map Name: Heber

Diagrammatic Sketch

Township 3S , Range 4E , Section 23

GPS: NAD 27, UTM 12S 4488634 N 460900 E

DISCUSSION

Dutch Canyon - Trend Study No. 17-17

This study is located within a small sagebrush-grass park surrounded by thick Gambel oak. The site is near the mouth of Dutch Hollow at an elevation of 6,200 feet. The site has moderately steep topography and a southerly aspect. Several of the baseline posts were missing in 2002 so the baseline was reset and is now only 300 feet in length. The site constitutes winter range for deer which exhibits moderate use. Elk and domestic livestock use is light on the site. Pellet group transect data taken in 2002 estimated 65 deer days use/acre (160 ddu/ha) and 9 elk days use/acre (23 edu/ha).

Soils are deep with an effective rooting depth of nearly 20 inches. The profile is rocky, but surface rock and pavement cover are low at about 5% in 1996 and 2002. Textural and chemical analysis reveals a sandy clay loam soil with neutral reactivity (pH = 6.9). Vegetation and litter cover are abundant and well distributed over the site. It provides effective protection from erosion. An erosion condition class assessment done in 2002 gave soils a slight erosion rating. Most evidence of erosion comes from the trails that traverse the site.

The key browse, mountain big sagebrush, had a density of about 1,400 plants/acre in 1989 and 1996. Density increased in 2002 to 2,380 plants/acre. With minimal young and about the same number of dead in the population, this increase in density is probably mostly due to the realignment of the baseline in 2002. The realignment of the baseline also resulted in sagebrush cover more than doubling between 1996 and 2002. Decadence was low in 1996 and 2002 at around 15%, a large improvement from 1989 when the decadent age class was estimated at 44% of the population. In 1996, there were almost as many dead sagebrush as live. That ratio was somewhat better in 2002. Poor vigor was estimated on 10% of the population in both 1996 and 2002, and use has been light to moderate during all readings. Sagebrush annual leader growth averaged 2.5 inches in 2002.

The bitterbrush population is composed mostly of mature plants. Density was estimated at 220 plants/acre in 2002, an increase from 80 plants/acre in 1996. Because there were no dead plants sampled in 2002 and no young plants sampled in 1996 , this change in density is due to the baseline realignment in 2002. Use on bitterbrush has been moderate to heavy, but vigor has remained normal and no decadent plants were sampled in any reading. Bitterbrush annual leader growth averaged 3.4 inches in 2002.

Gambel oak clones surround the sagebrush opening sampled by the baseline. Oak density has remained fairly stable over the past three readings, estimated at 2,600 stems/acre in 2002. Utilization has been mostly light in all years and decadence low. Vigor was normal throughout the population in 1983-1996, but 16% were classified as having poor vigor in 2002 due to frost damage.

The herbaceous understory is dominated by annual species. Although cheatgrass declined in nested and quadrat frequencies in 2002, cover remained at just over 8% and continues to be the dominate grass. Perennial grasses are sparse and include Kentucky bluegrass, Sandberg bluegrass, and bulbous bluegrass. Smooth brome and mountain brome were sampled in 1996 with the previous baseline setup. Nearly all of the perennial grasses sampled on this site were found growing in or near oak clones. Forbs are diverse, but composition is poor. Leafy spurge is the most abundant perennial species, providing 65% of the forb cover in 2002. Annual forbs are abundant, especially pale alyssum. Sum of nested frequency for all perennial herbaceous species slightly declined between 1996 and 2002.

1983 APPARENT TREND ASSESSMENT

Soil trend appears to be stable to slightly declining. While erosion is not currently a significant problem, the relative lack of ground cover renders the area susceptible to soil loss when high intensity storms occur. Vegetatively, browse is overwhelmingly dominant and will continue to be so. There is the potential for an increase in the Gambel oak population accompanied by a decrease in the productivity of mountain big sagebrush.

1989 TREND ASSESSMENT

Trend for soils is slightly up. Bare soil decreased to 4%, and litter and vegetation cover increased. Slight soil movement is detectable in the shrub interspaces. Trend for browse is slightly down. Mountain big sagebrush declined in density, while decadence increased from 24% to 44%. Recruitment remains good. Gambel oak nearly doubled in density and further increases will likely be to the detriment of sagebrush. Trend for the herbaceous understory is slightly up. Perennial grasses remain sparse, but sum of nested frequency values for both grasses and forbs have increased since 1983.

TREND ASSESSMENT
soil - slightly up (4)
browse - slightly down (2)
herbaceous understory - slightly up (4)

1996 TREND ASSESSMENT

Soil trend is slightly improving with a decrease in the combined cover of rock and pavement. Bare soil covers only 2% of the surface at the present time. No erosion is apparent and there is adequate vegetative and litter cover to protect the soil. Browse trend is stable. Decadence in the mountain big sagebrush population declined to 16%, but the number of dead plants nearly equals the number of living plants. Young recruitment is moderate at 16%. Use is light. Most other browse populations have similar densities as reported in 1989. Herbaceous understory trend is stable. Although there is an increase in sum of nested frequency for grasses and forbs since 1989, many of the species are annual increasers. A better composition is desired. Sum of nested frequency for perennials slightly increased.

TREND ASSESSMENT
soil - slightly up (4)
browse - stable (3)
herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Trend for soil is stable. Bare soil increased to 11%, but the ratio of protective cover to bare soil is still high at over 4:1. Erosion is slight because vegetation and litter cover are abundant and well disbursed. Trend for browse is stable. Density estimates for mountain big sagebrush and bitterbrush both increased, but these changes are due to the realignment of the baseline. The mountain big sagebrush population has stable decadency and vigor levels. Use is light to moderate. Recruitment from young plants is low, but this is to be expected with drought in 2002 and the abundance of a competitive weedy understory. Trend for herbaceous species is slightly down, while composition remains poor. Cheatgrass remains the dominant grass and the only abundant perennial forb is leafy spurge. Sum of nested frequency for all perennial species combined declined in 2002.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 17

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
G	Agropyron spicatum	-	-	-	-	-	-	-	-	-	.00
G	Bromus carinatus	-	-	2	-	-	-	1	-	.00	-
G	Bromus inermis	-	5	10	-	-	3	3	-	.33	-
G	Bromus japonicus (a)	-	-	a-	b81	-	-	-	34	-	.70
G	Bromus tectorum (a)	-	-	b336	a228	-	-	96	76	8.16	8.21
G	Poa bulbosa	a-	a-	a-	b17	-	-	-	5	-	.86
G	Poa fendleriana	-	7	-	-	-	2	-	-	-	-
G	Poa pratensis	a10	ab18	ab30	b36	5	8	12	15	1.11	.56
G	Poa secunda	-	1	-	7	-	1	-	4	-	.56
Total for Annual Grasses		0	0	336	309	0	0	96	110	8.16	8.91
Total for Perennial Grasses		10	31	42	60	5	14	16	24	1.44	1.98
Total for Grasses		10	31	378	369	5	14	112	134	9.61	10.90
F	Alyssum alyssoides (a)	-	-	245	198	-	-	75	68	2.12	2.73
F	Artemisia dracunculus	3	2	-	-	1	1	-	-	-	-
F	Artemisia ludoviciana	3	3	8	1	2	2	3	1	.33	.03
F	Astragalus spp.	-	-	-	1	-	-	-	1	-	.00
F	Camelina microcarpa (a)	-	-	-	3	-	-	-	1	-	.00
F	Calochortus nuttallii	a5	b21	a-	a4	3	10	-	3	-	.01
F	Chenopodium fremontii (a)	-	-	3	5	-	-	1	2	.00	.04
F	Cirsium spp.	-	-	9	2	-	-	4	2	.02	.04
F	Collomia linearis (a)	-	-	a16	b36	-	-	8	20	.04	.15
F	Collinsia parviflora (a)	-	-	-	3	-	-	-	1	-	.00
F	Cryptantha spp.	-	2	-	-	-	1	-	-	-	-
F	Draba spp. (a)	-	-	-	2	-	-	-	1	-	.00
F	Epilobium brachycarpum (a)	-	-	4	5	-	-	3	2	.04	.01
F	Eriogonum brevicaule	-	-	-	1	-	-	-	1	-	.00
F	Erigeron spp.	a-	a-	b18	a-	-	-	7	-	.16	-
F	Eriogonum racemosum	a-	ab4	b10	ab3	-	4	5	3	.03	.06
F	Euphorbia esula	a-	a-	a-	b114	-	-	-	41	-	7.96
F	Gayophytum ramosissimum (a)	-	-	-	2	-	-	-	1	-	.00
F	Heterotheca villosa	-	-	-	-	-	-	-	-	.15	-
F	Holosteum umbellatum (a)	-	-	a-	b20	-	-	-	9	-	.14
F	Lactuca serriola	a3	ab14	b34	a-	1	8	14	-	.24	-
F	Lupinus argenteus	-	-	5	6	-	-	3	3	.21	.45
F	Polygonum douglasii (a)	-	-	b28	a8	-	-	11	5	.05	.02
F	Sisymbrium altissimum (a)	-	-	6	3	-	-	2	1	.07	.03
F	Taraxacum officinale	-	-	-	1	-	-	-	1	-	.03

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
F	Tragopogon dubius	$_{a}$2	$_{ab}$17	$_{c}$93	$_{b}$31	1	9	46	15	.76	.36
F	Unknown forb-annual (a)	-	-	$_{b}$96	$_{a}$-	-	-	36	-	2.63	-
F	Verbascum thapsus	2	7	6	-	1	3	3	-	.39	-
F	Vicia americana	$_{a}$-	$_{b}$10	$_{a}$-	$_{a}$-	-	5	-	-	-	-
F	Viguiera multiflora	$_{a}$6	$_{c}$78	$_{b}$31	$_{a}$3	4	33	14	2	.36	.04
F	Zigadenus paniculatus	-	3	-	-	-	1	-	-	.00	-
Total for Annual Forbs		0	0	398	285	0	0	136	111	4.98	3.16
Total for Perennial Forbs		24	161	214	167	13	77	99	73	2.68	8.99
Total for Forbs		24	161	612	452	13	77	235	184	7.66	12.15

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 17

Type	Species	Strip Frequency		Average Cover %	
		'96	'02	'96	'02
B	Artemisia tridentata vaseyana	37	60	8.92	18.89
B	Chrysothamnus viscidiflorus viscidiflorus	1	2	-	.03
B	Gutierrezia sarothrae	44	31	2.31	1.21
B	Purshia tridentata	3	10	.45	2.61
B	Quercus gambelii	31	23	7.17	5.42
Total for Browse		116	126	18.86	28.18

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 17

Species	Percent Cover	
	'96	'02
Artemisia tridentata vaseyana	-	24.58
Chrysothamnus viscidiflorus viscidiflorus	-	.25
Gutierrezia sarothrae	-	1.92
Purshia tridentata	-	5.25
Quercus gambelii	14.0	8.08

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 17

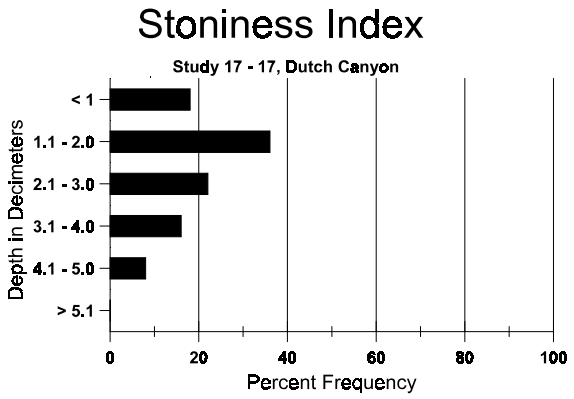
Species	Average leader growth (in) '02
Artemisia tridentata vaseyana	2.6
Purshia tridentata	3.4

BASIC COVER --
Herd unit 17 , Study no: 17

Cover Type	Nested Frequency		Average Cover %			
	'96	'02	'83	'89	'96	'02
Vegetation	383	329	0	3.25	34.90	50.00
Rock	130	87	5.00	2.25	2.64	2.45
Pavement	144	150	6.00	11.50	2.76	2.95
Litter	400	387	67.25	78.50	71.23	58.48
Cryptogams	24	16	.25	0	.10	.30
Bare Ground	130	165	21.50	4.50	2.18	11.38

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 17, Dutch Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
19.7	49.3 (17.5)	6.9	48.2	25.4	28.4	2.5	32.9	160.0	.5



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 17

Type	Quadrat Frequency		Pellet Transect	
	'96	'02	Pellet Groups per Acre ⁄02	Days Use per Acre (ha) ⁄02
Sheep	1	-	-	-
Rabbit	6	8	-	-
Elk	-	2	122	9 (23)
Deer	25	24	844	65 (160)
Cattle	-	1	-	-

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 17

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	22	28	0
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'96	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'83	0		-
	'89	0		-
	'96	0		-
	'02	0		-

Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	2	-	-	1	-	-	-	-	-	3	-	-	-	100			3
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	26	-	-	-	-	-	-	-	-	26	-	-	-	866			26
	89	9	-	-	-	-	-	-	-	-	9	-	-	-	300			9
	96	9	-	-	2	-	-	-	-	-	11	-	-	-	220			11
	02	2	1	-	-	-	-	-	-	-	2	-	1	-	60			3
M	83	27	11	-	-	-	-	-	-	-	38	-	-	-	1266	22	40	38
	89	10	3	-	-	-	1	-	-	-	14	-	-	-	466	23	22	14
	96	46	-	-	1	-	-	-	-	-	47	-	-	-	940	23	43	47
	02	79	15	2	2	-	-	-	-	-	90	3	5	-	1960	27	44	98
D	83	16	3	1	-	-	-	-	-	-	20	-	-	-	666			20
	89	11	6	1	-	-	-	-	-	-	17	-	-	1	600			18
	96	11	-	-	-	-	-	-	-	-	4	-	-	7	220			11
	02	15	2	-	1	-	-	-	-	-	12	-	3	3	360			18
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	1060			53
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	940			47

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	17%	01%	00%	-51%
'89	22%	05%	02%	+ 1%
'96	00%	00%	10%	+42%
'02	15%	02%	10%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'83	2798		24%
	'89	1366		44%
	'96	1380		16%
	'02	2380		15%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	1	-	-	-	-	-	1	-	-	-	20	19	40	1
	02	2	-	-	1	-	-	-	-	-	3	-	-	-	60	20	32	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'96	00%	00%	00%	+67%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'89	0			-
'96	20			-
'02	60			-

Gutierrezia sarothrae																		
S	83	11	-	-	-	-	-	-	-	-	11	-	-	-	366			11
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	11	-	-	-	-	-	-	-	-	11	-	-	-	366	9	11	11
	89	125	-	-	-	-	-	-	-	-	125	-	-	-	4166	11	13	125
	96	105	-	-	-	-	-	-	-	-	105	-	-	-	2100	8	13	105
	02	70	-	-	5	-	-	-	-	-	75	-	-	-	1500	9	11	75
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	11	-	-	-	-	-	-	-	-	11	-	-	-	366			11
	96	31	-	-	-	-	-	-	-	-	28	-	-	3	620			31
	02	8	-	-	-	-	-	-	-	-	3	-	-	5	160			8
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	500			25
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+89%
'89	00%	00%	00%	-40%
'96	00%	00%	02%	-39%
'02	00%	00%	06%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	499	Dec:	0%
'89	4565		8%
'96	2740		23%
'02	1660		10%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	-	-	2	-	-	-	-	-	-	2	-	-	-	66	13	25	2
	89	-	1	2	-	-	-	-	-	-	3	-	-	-	100	15	31	3
	96	-	2	1	-	1	-	-	-	-	4	-	-	-	80	19	87	4
	02	-	1	3	-	-	5	1	-	-	9	1	-	-	200	17	76	10

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	100%	00%	+34%
'89	33%	67%	00%	-20%
'96	75%	25%	00%	+64%
'02	09%	73%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	66	Dec:		-
'89	100			-
'96	80			-
'02	220			-

Quercus gambelii																		
S	83	16	-	-	-	-	-	-	-	-	16	-	-	-	533			16
	89	13	-	-	-	-	-	-	-	-	13	-	-	-	433			13
	96	3	8	-	1	-	-	-	-	-	12	-	-	-	240			12
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	28	12	-	-	-	-	-	-	-	40	-	-	-	1333			40
	89	43	7	-	-	-	-	-	-	-	50	-	-	-	1666			50
	96	40	-	-	2	-	-	-	-	-	31	11	-	-	840			42
	02	32	-	-	4	-	-	-	-	-	36	-	-	-	720			36
M	83	-	3	-	-	-	-	-	-	-	3	-	-	-	100	39	21	3
	89	5	19	-	-	-	-	-	-	-	24	-	-	-	800	30	13	24
	96	35	1	-	11	-	-	12	5	-	64	-	-	-	1280	58	50	64
	02	30	36	6	5	-	-	-	-	-	67	6	4	-	1540	34	25	77
D	83	1	2	-	-	-	-	-	-	-	3	-	-	-	100			3
	89	-	10	1	-	-	-	-	-	-	11	-	-	-	366			11
	96	3	1	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	9	-	5	3	-	-	-	-	-	-	-	-	17	340			17
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	340			17
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	380			19

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	37%	00%	00%	+46%
'89	42%	01%	00%	-22%
'96	02%	00%	00%	+15%
'02	28%	08%	16%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	1533	Dec:	7%
'89	2832		13%
'96	2200		4%
'02	2600		13%